**Measurement Concepts & Classification of Costs**

**Why Cost Management?**

Cost management systems serve two main purposes:

1. **Transaction Reporting & Financial Reporting** — For reliable external financial statements.
2. **Decision-Making Support** — To help management control operations and make strategic decisions.

**Main Goal:**
To help management focus on the **factors that make the company successful**.

---

**Critical Success Factors (CSFs)**

- **Definition:** Key variables or actions that directly affect an organization's success.
- **Examples:** Cost efficiency, product quality, innovation, customer satisfaction, or return on investment.
- **Purpose:** Activities related to CSFs must be performed with excellence because they directly impact **competitive advantage** and **strategic goals**.

**Strategic Cost Management:**
Uses cost information to support **strategic decisions**—e.g., identifying:

- Cost or productivity advantages over competitors.
- Value-added features that justify higher prices.

---

**Evaluating Operating Performance**

Performance evaluation involves two key dimensions:

**1. Effectiveness**

- Measures **goal achievement** (Are we doing the right things?).
- Linked to the company's **strategic goals**, such as:
    - Operating income targets
    - Market share growth
    - New product launches
    - Return on investment (ROI)
- Example: Comparing **actual results** vs. **budgeted results** to assess goal attainment.

**2. Efficiency**

- Measures **resource utilization** (Are we doing things the right way?).
- Efficient operations minimize costs while maintaining output quality.

- Example:
    - A company may achieve high sales (**effective**) but use too many resources (**inefficient**).
    - Another may use fewer resources (**efficient**) but fail to reach sales targets (**ineffective**).

**Note:** Efficiency and effectiveness are **independent** — both must be achieved for long-term success.

**Role of Cost Management:**
Provides data to evaluate both **effectiveness** (goal achievement) and **efficiency** (resource usage).

---

**Classification of Costs**

Understanding cost types is vital for planning, control, and decision-making.

**Difference Between Costs and Expenses**

| Term | Definition | Example |
|---|---|---|
| **Cost** | Resources sacrificed to achieve an objective. (Economic concept) | Purchase of machinery, materials, or labor. |
| **Expense** | A cost recognized in the **income statement** for a specific period. (Accounting concept) | Depreciation, Cost of Goods Sold (COGS), Rent expense. |

- Every **expense** was a **cost** before being recorded in the income statement.
- Not all **costs** become **expenses**:
    - Some costs are **capitalized** (e.g., fixed assets → depreciated later).
    - Some are **implicit costs** (e.g., opportunity costs) — not recorded in accounting but still economically real.

**Implicit vs. Explicit Costs**

- **Explicit Costs:** Actual outlays recorded in accounting books (e.g., wages, materials).
- **Implicit Costs:** Foregone benefits (e.g., lost interest income or alternative use of resources).

Example: Using your own building for business → foregone rent is an **implicit cost**.

---

✅ **Key Takeaways**

- **Cost Management** = decision support for strategy + performance.
- **CSFs** = focus on what drives success and competitive advantage.
- **Effectiveness** = achieving goals; **Efficiency** = using resources well.
- **Cost ≠ Expense:** All expenses are costs, but not all costs are expenses.
- **Implicit costs** matter in decision-making though not shown in financial statements.

**Product Costs vs. Period Costs**

## 1️⃣ Product Costs (Inventoriable Costs)

**Definition:**
Product costs are **costs directly related to manufacturing a product** — costs that are necessary to bring the product to a saleable condition.

These costs are **"attached"** to the units produced and are shown on the **Balance Sheet as inventory** until sold.
Once sold, they are transferred to the **Income Statement as Cost of Goods Sold (COGS)**.

**Main Components:**

| Type | Description | Examples |
|---|---|---|
| **Direct Materials (DM)** | Raw materials directly used in the product. | Plastic, metal, components, freight-in, insurance on materials. |
| **Direct Labor (DL)** | Wages of workers directly involved in production. | Machine operators, assembly line workers. |
| **Manufacturing Overhead (MOH)** | All indirect manufacturing costs (both fixed & variable). | Factory rent, indirect labor, indirect materials, utilities, depreciation of factory equipment. |

⚙️ **Formula:**
**Product Cost = Direct Materials + Direct Labor + Manufacturing Overhead**

---

## 2️⃣ Period Costs

**Definition:**
Period costs are **non-manufacturing costs** — they are **not attached to products** and are **expensed in the period incurred**, regardless of when the related goods are sold.

**Examples:**

- Selling expenses → advertising, sales commissions, delivery costs.
- Administrative expenses → office salaries, head office rent, accounting & HR costs.

🧾 **Appear directly on the Income Statement** as "Operating Expenses".

---

## 3️⃣ Groupings of Product Costs

| Classification | Includes | Purpose/Focus |
|---|---|---|
| **Prime Costs** | Direct Materials + Direct Labor | Measures direct manufacturing inputs. |

| Classification | Includes | Purpose/Focus |
|---|---|---|
| **Conversion Costs** | Direct Labor + Manufacturing Overhead | Measures cost to convert raw materials into finished goods. |
| **Manufacturing Costs** | Prime Costs + Manufacturing Overhead | Represents **total production cost** (all costs to make the product). |

**Note:**

- **Direct Labor** appears in both Prime and Conversion costs.
- **Manufacturing Costs ≠ Total Costs** → Selling & Administrative are *period costs*, not included.

---

### 4️⃣ Example: Cost Flow in Manufacturing

| Stage | Cost Type | Financial Statement Impact |
|---|---|---|
| Raw materials purchased | Product Cost | Balance Sheet → Raw Materials Inventory |
| Materials used in production | Product Cost | Work in Process Inventory |
| Goods completed | Product Cost | Finished Goods Inventory |
| Goods sold | Product Cost | Income Statement → COGS |
| Advertising campaign | Period Cost | Income Statement → Selling Expense |

---

### ✅ Key Takeaways

- **Product Costs** → Inventoriable → Become **COGS** when sold.
- **Period Costs** → Expensed immediately in the period incurred.
- **Prime = DM + DLxx**
- **Conversion = DL + MOH**
- **Manufacturing = DM + DL + MOH**
- **Direct Labor** appears in both **Prime** and **Conversion** categories.

**Period Costs & Cost Behavior**

---

### 1️⃣ Period Costs (Nonmanufacturing Overheads)

**Definition:**
Period costs are **nonproduction costs** — all costs *other than* product costs.
They are **expensed in the period incurred**, not included in inventory.

| Key Feature | Explanation |
|---|---|
| **Timing** | Expensed immediately in the income statement. |
| **Examples** | Selling, General & Administrative (SG&A), Accounting, Office rent, Advertising, Legal, HR, Executive salaries. |
| **Financial Reporting** | Under **U.S. GAAP/IFRS**, period costs **cannot** be capitalized or added to product cost. |
| **Internal Use** | May be allocated to products for **pricing or performance analysis**, but only for *internal decision-making* (not for external reporting). |

---

### 2️⃣ Relationship Between Product & Period Costs

| Product Costs | Period Costs |
|---|---|
| Related to **production** | Related to **nonproduction** (selling, admin) |
| Become **inventory** (then COGS when sold) | Expensed **immediately** |
| Examples: DM, DL, MOH | Examples: Marketing, HR, Accounting, Office rent |
| Appears on **Balance Sheet** first | Appears only on **Income Statement** |

---

### 3️⃣ Costs Based on Level of Activity

Both **product** and **period** costs can be classified as **fixed**, **variable**, or **mixed**, depending on how they behave with changes in activity level.

---

**A. Fixed Costs**

- **Definition:** Do **not change in total** within the **relevant range** of activity.
- **Behavior:**
  - **Total fixed cost:** constant.
  - **Per-unit fixed cost:** decreases as activity increases (and vice versa).
- **Examples:**
  - Factory rent, building depreciation, plant manager salary (production)
  - Office rent, executive salaries (period)
- **Relevant Range:**
  - The range of activity where fixed costs remain constant.
  - If production exceeds capacity → new fixed costs arise (e.g., a new factory).

🧠 **Exam Tip:**
If no “relevant range” is mentioned, assume fixed costs stay constant.

**Formula:**

$$\text{Fixed Cost per Unit} = \frac{\text{Total Fixed Cost}}{\text{Units Produced}}$$

Increases or decreases inversely with volume.

---

**B. Variable Costs**

- **Definition:** Change **in total** in direct proportion to changes in activity.
- **Behavior:**
    - **Total variable cost:** increases/decreases with activity level.
    - **Per-unit variable cost:** constant.
- **Examples:**
    - Direct material, direct labor (production)
    - Sales commissions, shipping (period)

**Formula:**

$$\text{Total Variable Cost} = \text{Variable Cost per Unit} \times \text{Activity Level}$$

💡 **Unit Contribution Margin:**
Selling Price per Unit − Variable Cost per Unit
(Used to cover fixed costs and generate profit.)

---

**C. Mixed Costs**

- **Definition:** Costs with both **fixed** and **variable** components.
- **Examples:**
    - Electricity (base fee + cost per kWh)
    - Salesperson’s pay (salary + commission)

**Formula (Cost Function):**

$$y = F + Vx$$

Where:

- **y** = total cost

- **F** = fixed cost
- **V** = variable cost per unit
- **x** = number of units (activity level)

**Example:**
If fixed manufacturing cost = $700,000 and variable = $20 per unit,

$$y = 700{,}000 + 20x$$

- At 10,000 units → total cost = $900,000
- Graph: straight line starting at $700,000 intercept.

---

### 4️⃣ Sub-Types of Mixed Costs

| Type | Description | Example |
|---|---|---|
| **Semi-Variable Cost** | Fixed base + variable portion that changes smoothly with activity. | Electricity bill (fixed fee + per-unit usage). |
| **Semi-Fixed (Step) Cost** | Fixed over a limited range, then "steps up" suddenly when activity exceeds that range. | Hiring an additional nurse for every 25 patients. |

🧩 **Difference:**

- **Semi-Variable:** Increases **gradually**.
- **Semi-Fixed (Step):** Increases **in steps**.

---

### 5️⃣ Total Cost Behavior Summary

| Cost Type | Total Cost Behavior | Cost per Unit Behavior | Example |
|---|---|---|---|
| **Fixed** | Constant within relevant range | Decreases as volume ↑ | Factory rent |
| **Variable** | Changes in direct proportion | Constant | Direct materials |
| **Mixed** | Changes with both fixed & variable parts | Decreases but not constant | Utility bills |

---

### ✅ Key Takeaways

- **Period costs** = nonproduction; expensed as incurred.
- **Fixed costs** constant in total, vary per unit.
- **Variable costs** constant per unit, vary in total.
- **Mixed costs** have both components.

- **Relevant range** determines cost behavior validity.
- **y = F + Vx** → core cost behavior equation.

**Direct vs. Indirect Costs**

**1. Direct Costs**

- **Definition:**
  Costs that can be **directly traced** to a specific **cost object** (e.g., a product, project, department, or customer).
- **Examples:**
  - **Direct materials** → raw materials used in production
  - **Direct labor** → wages paid to workers directly involved in production
- **Key point:**
  Direct costs are **easily identifiable and measurable** for a specific cost object.

---

**2. Indirect Costs**

- **Definition:**
  Costs that **cannot be directly traced** to a specific cost object.
- **Treatment:**
  These are **pooled** together into **cost pools** and **allocated** to cost objects using an **allocation base**.
- **Examples:**
  - Factory rent
  - Utilities
  - Indirect materials (like glue, nails, lubricants)
  - Indirect labor (e.g., maintenance, supervisors)
- **Manufacturing overhead** = group of all manufacturing indirect costs.

---

**3. Key Terms**

- **Cost Object:**
  Anything for which separate cost information is desired (product, process, contract, etc.).
- **Cost Pool:**
  A group of **indirect costs** that share the same **allocation base**.
- **Allocation Base (Cost Driver):**
  The factor used to distribute indirect costs — e.g., **machine hours**, **labor hours**, etc.

- **Cost Driver:**
  Any activity, event, or volume measure that **causes a cost to occur**.

---

**4. Examples in Context**

| Type of Cost | Direct/Indirect | Cost Object Example |
|---|---|---|
| Wood used in furniture | Direct | Table |
| Factory supervisor's salary | Indirect | All products made in the factory |
| Machine depreciation | Indirect | All products using that machine |
| Wages of assembly line worker | Direct | The product being assembled |

**Other Costs and Cost Classifications**

**1. Explicit Costs (Out-of-Pocket Costs)**

- **Definition:** Costs involving actual cash payment.
- **Examples:** Wages, raw materials, rent, loan interest, supplier payments.
- **Notes:**
  - Recorded in accounting records.
  - Usually become expenses (e.g., COGS, wages expense).
  - Timing of expense recognition may differ — e.g., inventory expense recognized upon sale.

---

**2. Implicit Costs (Imputed or Economic Costs)**

- **Definition:** Costs that do **not** involve cash outflow and are **not recorded** in the books.
- **Examples:**
  - Interest income foregone on funds invested in equipment instead of a deposit.

**Example of Implicit Cost**

A company has ₹10,00,000 in cash.

- If the company invests this money in a **bank deposit**, it could earn ₹80,000 per year in interest.
- Instead, the company decides to use the ₹10,00,000 to buy **manufacturing equipment**.

👉 The **foregone ₹80,000 interest income** is an **implicit cost (opportunity cost)** of purchasing the equipment.

- It does **not appear** in the accounting records or income statement.

- But it is **economically relevant** because it represents the benefit sacrificed in choosing the machine over the deposit..
- ✅ **If Machinery Earns More Than ₹80,000**
- Let's say the machinery generates **₹1,20,000/year** in net benefits (e.g., cost savings, increased production, etc.).
- **Opportunity Cost (Implicit Cost)**: Still ₹80,000 (the foregone bank interest)
- **Net Economic Benefit**: ₹1,20,000 (actual return) − ₹80,000 (opportunity cost) = **₹40,000 economic profit**
- So, **the implicit cost still exists** — it doesn't disappear just because the machinery earns more. But now:
- **The decision is economically justified** because the return from the machinery exceeds the opportunity cost.
- ❗ **Key Insight**
- **Implicit cost is always based on the *next best alternative*** — in this case, the ₹80,000 from the bank.
- It **doesn't change** based on how much the chosen option earns.
- What changes is whether the decision was **economically beneficial**:
- If machinery earns **less than ₹80,000** → Bad decision (economic loss)
- If machinery earns **more than ₹80,000** → Good decision (economic profit)

🔎 **Types of Implicit Costs (Beyond Opportunity Cost)**

**1. Foregone Rental Income**

- If a company uses a building it owns for operations instead of renting it out, the **lost rental income** is an implicit cost.
- Example: Using owned warehouse space for storage rather than leasing it to another firm.

**2. Owner's Time and Effort**

- When the owner works in the business without drawing a salary, the **value of their time** (what they could earn elsewhere) is an implicit cost.
- Example: An entrepreneur managing their shop instead of working as a consultant earning ₹1,00,000 per month.

**3. Depreciation of Owned Assets (Non-Cash Use)**

- If machinery or vehicles are used in-house, the **wear and tear** represents an implicit cost, even if no cash is paid out.
- Example: Using personal car for business deliveries instead of hiring a transport service.

**4. Foregone Interest or Investment Returns**

- The classic case you mentioned: using cash to buy equipment instead of investing in securities.
- Example: ₹10,00,000 invested in machinery instead of earning 6% interest in a bank deposit → implicit cost = ₹60,000 foregone.

**5. Use of Company-Owned Resources**

- Any resource (land, capital, intellectual property) used internally rather than leased, sold, or licensed externally creates implicit costs.
- Example: Using patented technology in-house instead of licensing it out for royalties.

🏭 **Example: Owner's Time in a Business**

**Scenario:**

You run a small business and **don't pay yourself a salary**. You work **40 hours/week** managing operations.

- You could have hired a manager for ₹50,000/month.
- But you do the work yourself, without any payment.

**Analysis:**

- **Implicit Cost**: Your time has value. The business is using your labor without a cash outflow. So, the **₹50,000/month** is an **implicit cost**.
- **Opportunity Cost?** Not necessarily.

👉 If you **don't have a realistic alternative job** (e.g., you're retired, or not seeking employment), then **there's no forgone income**. So, **your time is an implicit cost**, but **not an opportunity cost**.

🧾 **Summary Table**

| Aspect | Value |
|---|---|
| **Implicit Cost** | ₹50,000/month (value of owner's unpaid labor) |
| **Opportunity Cost** | ❌ None (no alternative income forgone) |

---

**3. Opportunity Costs**

- **Definition:** The **income or benefit lost** by choosing one alternative over another.

  **Formula Concept:**
  Opportunity Cost = Benefit from Best Alternative – Benefit from Chosen Option

- **Type:** Implicit (economic) cost.

**Example of Opportunity Cost**

A company has ₹5,00,000 in cash.

- **Option A:** Use the money to purchase **inventory** for resale.
- **Option B:** Deposit the money in a **bank account** that pays 6% annual interest.

👉 If the company chooses **Option A (inventory)**, it **forgoes ₹30,000 in interest income** (₹5,00,000 × 6%).

- That ₹30,000 is the **opportunity cost** of investing in inventory instead of the bank deposit.
- It is **not recorded** in the accounting books, but it is an **economic cost** that must be considered in decision-making.
- **₹30,000** of foregone interest income **is both an *opportunity cost* and an *implicit cost***

💡 **Key Concepts**

| Term | Meaning | In This Example |
|---|---|---|
| **Opportunity Cost** | The benefit lost from the next best alternative | ₹30,000 interest not earned from the bank |
| **Implicit Cost** | A non-cash cost representing the value of resources used | Same ₹30,000, because no actual cash outflow occurred |

🧠 **Why ₹30,000 Is an Implicit Cost**

- The company didn't pay ₹30,000 to anyone — there's **no explicit transaction**.
- But by choosing inventory over the bank deposit, it **sacrificed potential income**.
- This **sacrifice is real and economically relevant**, even though it's **not recorded in the accounting books**.

So:

**All opportunity costs are implicit costs, but not all implicit costs are opportunity costs.**

In this case, the ₹30,000 is **both**.

- **Implicit cost:** Not recorded in accounting, but relevant for economic decisions.
- **Opportunity cost:** The most common implicit cost, representing the **benefit sacrificed** from the next best alternative.
- **Explicit costs** → affect **accounting profit**.
- **Implicit costs (incl. opportunity costs)** → affect **economic profit**.
- **Economic profit = Accounting profit – Implicit costs.**

---

**4. Carrying Costs (of Inventory)**

- **Definition:** Costs incurred for **holding inventory**.
- **Components:**
    - Storage rent, utilities, insurance, taxes, security, handling costs
    - Obsolescence, damage, theft losses

    - **Opportunity cost** of capital tied up in inventory
- **Note:**
    - **Expensed as incurred** (not capitalized).
    - **Do not add value** to inventory.

---

**5. Sunk Costs**

- **Definition:** Costs that have **already been incurred** and **cannot be recovered**.
- **Example:** Past R&D, equipment purchased in the past.
- **Relevance: Irrelevant** for decision-making — cannot be changed by future actions.

---

**6. Infrastructure / Committed Costs**

- **Definition:** Long-term, **fixed costs** necessary to maintain the business's ability to operate.
- **Examples:**
    - Purchase of land, buildings, machinery, or franchises.
- **Accounting Treatment:**
    - Shown as assets; expensed later through **depreciation or amortization**.

---

**7. Discretionary (Flexible) Costs**

- **Definition:** Costs that management **chooses to incur or not incur** in the short term.
- **Examples:** Advertising, R&D, employee training, community programs.
- **Characteristics:**
    - Can be deferred short-term without immediate harm.
    - Usually **fixed in nature**, but decision-based.
    - Important for **long-term growth**.

---

**8. Engineered Costs**

- **Definition:** Costs that have a **clear cause-and-effect relationship** between input and output.
- **Examples:**
    - Direct materials and direct labor (based on engineering specifications).
- **Nature:** Typically **variable costs** — increase with production volume.

---

**9. Marginal Cost**

- **Definition:** The **additional cost** of producing **one more unit** of output.
- **Use:**
    - Key concept in **decision-making** and **cost-volume-profit (CVP)** analysis.

---

⚙️ **Special Note: Overtime Premium Treatment**

- **Normal Rate (e.g., $20/hr) → Direct Labor Cost**
- **Overtime Premium (e.g., extra $10/hr) →**
    - **Factory Overhead**, if general overtime.
    - **Direct Labor**, if overtime is due to a **specific job/customer request**.

| **Scenario** | **Overtime Premium Treatment** | **Example** |
|---|---|---|
| General overtime for production | Factory overhead (spread over all units) | $100 added to overhead pool |
| Overtime for a specific job | Direct labor (charged to that job) | $100 added to that job's cost |